

## PATENT COOPERATION TREATY

10/51706

from the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT/PIC 03 DEC 2004

PCT

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6 JUL 2004

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NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

(PCT Rule 71.1)

		Date of mailing (day/month/year)  22.07.2004
Applicant's or agent's file reference  CJH02226WO		<b>IMPORTANT NOTIFICATION</b>
International application No.  PCT/GB 03/02409	International filing date (day/month/year)  03.06.2003	Priority date (day/month/year)  10.06.2002
Applicant  THE WELDING INSTITUTE et al.		

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/B/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx 528656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Schremethüsens, S Tel. +49 89 2399-2567	
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## PATENT COOPERATION TREATY

## PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>CJH02226WO</b>	<b>FOR FURTHER ACTION</b>	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA416)
International application No. <b>PCT/GB 03/02409</b>	International filing date (day/month/year) <b>03.06.2003</b>	Priority date (day/month/year) <b>10.06.2002</b>
International Patent Classification (IPC) or both national classification and IPC <b>C04B38/08</b>		
Applicant <b>THE WELDING INSTITUTE et al.</b>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I  Basis of the opinion
- II  Priority
- III  Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV  Lack of unity of invention
- V  Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI  Certain documents cited
- VII  Certain defects in the international application
- VIII  Certain observations on the international application

Date of submission of the demand <b>30.12.2003</b>	Date of completion of this report <b>22.07.2004</b>
Name and mailing address of the international preliminary examining authority: European Patent Office D-80296 Munich Tel. +49 89 2399 - 0 Tx. 523658 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  <b>Mayne, J</b> Telephone No. +49 89 2399-8572



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/GB 03/02409

**I. Basis of the report**

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-10 as originally filed

**Claims, Numbers**

1-19 as originally filed

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of International preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**International application No. **PCT/GB 03/02409****V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement****1. Statement**

Novelty (N)	Yes:	Claims	1-12, 17-19
	No:	Claims	13-16
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-19

**2. Citations and explanations**

see separate sheet

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB03/02409

**Re Item V**

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1: DE-A-19701109
- D2: WO 01/46084
- D3 US-A-5,332,200

D2 was cited in the description (p. 1). A copy of D2 was annexed to the written opinion.

**Article 33(2) PCT**

The pyrolysed product of independent claim 13 will comprise a matrix comprising spinel and an inorganic particulate filler having hollow or lamellar structure.

The product of claim 13 is further defined by its method of manufacture which is the pyrolysis of a composition according to any of the preceding claims.

It is not certain that the product of claim 13 will contain also a metal powder, a metal oxide powder or mixtures thereof since these components of the composition of claim 1 may have fully reacted with the liquid pre-ceramic binder during pyrolysis to form spinel.

A product must fulfill the requirements of novelty and inventive step regardless of its method of manufacture. A product is not automatically novel even if produced by a novel process.

D1 is concerned with heat resistant ceramics comprising a matrix material and a filler in the form of hollow particles (D1, claim 1).

According to the description of D1 the filler is an inorganic material, such as hollow spheres of corundum ( $\text{Al}_2\text{O}_3$ ) (D1, p. 2, l. 63-65). In this passage the matrix comprises spinel and another metal oxide, namely magnesia.

Hence the body of independent claim 13 is not novel with respect to D1.

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**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB03/02409

D3 is concerned with refractory ceramic materials used as liners for induction furnaces. The liner (30) can take the form of bonded-together hollow ceramic spheres in a ceramic matrix (col. 2, l. 55-57, col. 5, l. 1-18 and claim 1).

Spinel is regarded as one of the materials suitable for the construction of the liner (col. 4, l. 52-58 and claim 1).

Hence the body of independent claim 13 is not novel with respect to D3.

Claim 13 does not fulfill the requirements of Article 33(2) PCT.

In the letter of reply the Applicant argued that due to the liquid methodology of the present application much greater amounts of hollow spheres can be incorporated in the ceramic matrix than the 10 wt% limit disclosed in D1.

This argument is not persuasive with regard to the novelty of independent claim 13. Neither claim 13 nor claim 1 says anything about the amounts of the inorganic particulate filler having hollow or lamellar structure.

D3 discloses that the ceramic furnace liner (30) is located on the base (14) (col. 4, l. 12-15 and Fig. 1). Regarding the base (14) as a substrate renders independent claim 14 not novel with respect to D3.

Base (14) can be made of refractory material and serves to define the central or working cavity of the furnace (D3, col. 3, l. 47-49 & col. 4, l. 12-15).

Claims 14-16 do not fulfill the requirements of Article 33(2) PCT.

D2 is considered to be closest of the prepublished prior art for claim 1.

It is concerned with high temperature resistant ceramic coatings which are rendered porous by incorporation of hollow ceramic spheres (p. 11, 2nd paragraph and p. 16, Table 1). Such coatings are used as thermal barrier coatings (D2, p. 1, 1st paragraph).

The ceramic matrix material can be in slurry form and comprises an aqueous solution of a pre-ceramic binder and a metal oxide powder as filler, see p. 18, 2nd paragraph.

Firing of the composition is also disclosed.

There is no suggestion that on firing spinel would be formed in the ceramic matrix.

Claims 1-12, 17-19 fulfill the requirements of Article 33(2) PCT.

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**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB03/02409

**Article 33(3) PCT**

The problem dealt with in the present application is to provide a thermal barrier coating material with good heat insulation and fire resistance properties, see p. 1.

The refractory material spinel is known to possess such properties. It is used in situations where such properties are required, see D1, p. 2, paragraphs 1 and 2 and D3, claim 1 and col. 4, l. 55-58.

D2 discloses, as discussed above, a composition comprising a metal oxide, a liquid pre-ceramic binder and hollow ceramic spheres for use as a thermal barrier coating.

D2 (p. 16, Table 1) discloses a number of ceramic materials for the matrix material. However, D2 makes the point (p. 16, last paragraph) that the matrix is not limited to these materials.

The skilled person is well aware that other ceramic materials are available for refractory purposes, for example those disclosed in D1 or D2.

By providing spinel as the metal oxide powder with the liquid pre-ceramic binders of D2 (Table 3) and the hollow spheres of D2 one arrives at the subject matter of claim 1 of the application.

Claims 1 and 17 do not actually specify that during pyrolysis the metal or metal oxide powder reacts with the liquid pre-ceramic binder it merely says that spinel should be formed on pyrolysis.

Nothing unexpected has been demonstrated for the matrix composition of claim 1 to be such that, on pyrolysis, it forms spinel, since spinel is a well known refractory material.

It is not clear what problem is being overcome by the presence of a spinel forming matrix composition in the composition of claim 1.

Claim 1 and independent claims 17 and 19 do not fulfill the requirements of Article 33(3) PCT.

The Applicant argued that the aluminium hydroxyl chloride liquid binder in D2 is very different from the liquid pre-ceramic binder of the present application.

This was not found persuasive since claim 1 of the application makes no mention of what the liquid pre-ceramic binder actually is. There is nothing to prevent it from being aluminium hydroxyl chloride liquid binder. Also D2 (Table 3) mentions numerous other types of liquid binders containing aluminium.

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**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB03/02409

>  
Dependent claims 2-12 and 18 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

1. The feature of claim 2 is seen in D2 (Table 3 and p. 18, 2nd paragraph) which discloses an aqueous solution of aluminium compounds as the liquid pre-ceramic binder.
2. The feature of claim 8 is seen in D2 (p. 16, 3rd paragraph and Table 1) which discloses a number of inorganic oxides as the hollow particles. These include alumina, silica, mullite, zirconia, zircon, YAG, yttria, ceria, hafnia, beryllia.
3. The feature of claim 18 is seen in D2 (p. 22, last paragraph) which gives plasma spraying as a method of forming a thermal barrier coating.
4. Nothing unexpected has been demonstrated for the features of the remaining dependent claims.